

Department of Chemistry

Dutika Sahu College, Laida, Sambalpur

Undergraduate Program (CBCS)

Program Outcomes (POs)

Sl.NOs	Outcome Areas	Description
PO1	Domain Knowledge and its Application	The course provides the students with comprehensive understanding of the fundamental concepts of chemistry. In depth knowledge of the core subjects-concept, theories, principles and its applications. Knowledge about the emerging topics and current developments in Chemistry and its related field.
PO2	Laboratory Skills and Techniques	The students gain good practical knowledge and laboratory skills by systematically training them. Through methodical instructions the students experience hands-on training of using basic chemical laboratory instruments. Basic knowledge about preparation of laboratory reagents, solutions and also protocols for their safe disposal. Ability to conduct experiments, analyses of data and interpretation of the results.
PO3	Communication Skills	Students develop good communication skills in writing and speaking through vigorous training of recording experiments, viva-voce and presentations. Ability to listen and convey effectively the knowledge and information acquired to scientific community and society at large.
PO4	Competency	Student develop the ability to think and work independently as well as adaptability to work efficiently in diverse groups. A leadership quality in student develop through its effective contributions in teamwork-based projects by designing and execution of the experiments. The opportunities for critical thinking, reflective thinking and analytical reasoning also add up the overall development of students.
PO5	Portable Skills	Students developed problem-solving skills to solve different types of chemistry- related problems. Attitude to be a life-long learner by consistently updating oneself with current knowledge, skills and technologies.
PO6	Environment and Sustainability	Student will understand the impact of scientific solutions in social and environmental contexts,demonstrating knowledge of and need for sustainable development.

Course Outcomes (COs)

Semester-I

CORE – 1- INORGANIC CHEMISTRY

After Completion of this course, the learners will be able to

Sl. Nos.	Course Outcomes
CO 1	Understand the atomic structure, chemical periodicity, types of chemical bonds and redox reactions.
CO 2	To solve the numerical problems based on redox reactions.
CO 3	Understand the term specific volume, molar volume.
CO 4	To know Calibration and use of apparatus.
CO 5	Preparation of solutions of different normality/molarity of titrants.

CORE-2- PHYSICAL CHEMISTR-I

Sl. Nos.	Course Outcomes
CO 1	Know the concepts of different states of matter.
CO 2	To understand equilibria and ionic equilibria and related numerical.
CO 3	Know the different structures of solids.
CO 4	Experimental determination of surface tension and viscosity.
CO 5	Experimental determination of pH of different solutions.

Semester-II

CORE-3- ORGANIC CHEMISTRY-I

Sl. Nos.	Course Outcomes
CO 1	Define organic acids and bases.
CO 2	Distinguish between geometrical and optical isomerism.
CO 3	Discuss kinetics, mechanism and stereochemistry of SN1 and SN2
CO 4	Compare between E1 and E2 reactions.
CO 5	Understand the evidences, reactivity and mechanism of various elimination and substitution reactions.
CO 6	To determine the melting point and effect of impurities on melting point.

CORE-4- PHYSICAL CHEMISTRY- II

Sl. Nos.	Course Outcomes
CO 1	Know the principles and concept of Thermodynamics.
CO 2	To understand laws of thermodynamics and concept of entropy.
CO 3	Understand the criteria of spontaneity of a process.
CO 4	To know the systems of variable compositions.
CO 5	Measure the heat capacity of a calorimeter and calculation of enthalpies of ionization of different acids and bases.

Semester-III

CORE-5- INORGANIC CHEMISTRY- II

Sl. Nos.	Course Outcomes
CO 1	Know the concept of metallurgy.
CO 2	Understand the concept of acids and bases
CO 3	Study of chemistry of s and p block elements and noble gases.
CO 4	Understand the characteristics of some food starches.
CO 5	Synthesis and applications of polymers.
CO 6	Standardization of solutions and estimation of different elements.

CORE-6- ORGANIC CHEMISTRY- II

Sl. Nos.	Course Outcomes
CO 1	To know the chemistry of halogenated hydrocarbon.
CO 2	Preparation and properties of alcohols, phenols. Aldehydes, ketones, carboxylic acids, esters, ethers and thio ethers.
CO 3	Synthetic applications of active methylene compounds.
CO 4	Acylation of aliphatic and aromatic amines experimentally.
CO 5	Bromination and nitration of different organic compounds.

CORE-7- PHYSICAL CHEMISTRY- III

Sl. Nos.	Course Outcomes
CO 1	To know the concept of phases, components and degrees of freedom.
CO 2	To understand rates, order and molecularity of a reaction.
CO 3	To know the concept of catalyst and catalysis.
CO 4	Determination of partition coefficient.
CO 5	To determine rate constants.

Semester-IV

CORE-8- INORGANIC CHEMISTRY- III

Sl. Nos.	Course Outcomes
CO 1	Understand about coordination compounds.
CO 2	To Know isomerism in coordination compounds.
CO 3	Study the Crystal Field Theory.
CO 4	Determination of CFSE.
CO 5	Basic idea on inorganic polymers.
CO 6	Chemistry of Lanthanoids and Actinoids.
CO 7	Preparation of complexes.
CO 8	Estimation of Ca and Mg.

CORE-9- ORGANIC CHEMISTRY- III

Sl. Nos.	Course Outcomes
CO 1	Study of nitrogen containing organic compounds.
CO 2	Get knowledge on polynuclear compounds and diazonium salts.
CO 3	Understanding of heterocyclic compounds, alkaloids and Terpenes.
CO 4	Study of detection of elements in organic compounds.
CO 5	Qualitative analysis of organic compounds.

CORE-10- PHYSICAL CHEMISTRY-IV

Sl. Nos.	Course Outcomes
CO 1	To study conductance of electrolytes.
CO 2	Discuss different types galvanic cells.
CO 3	Determination of cell potential and pH by EMF measurements.
CO 4	Carried out conductometric titrations.
CO 5	To calculate transport number.

Semester-V**CORE-11 ORGANIC CHEMISTRY-IV**

Sl. Nos.	Course Outcomes
CO 1	Know the principles of spectroscopy.
CO 2	To understand different types of spectroscopy.
CO 3	To understand UV, IR and NMR spectroscopy.
CO 4	To give an extended knowledge about Carbohydrates.
CO 5	Qualitative analysis of carbohydrates

CORE-12 PHYSICAL CHEMISTRY- V

Sl. Nos.	Course Outcomes
CO 1	To understand quantum chemistry.
CO 2	To know application of quantum mechanics in different systems.
CO 3	To understand molecular spectroscopy.
CO 4	To give an extended knowledge on photochemistry.
CO 5	Knowledge on spectrophotometric titrations.
CO 6	To understand photometric titrations.

DSE-1 POLYMER CHEMISTRY

Sl. Nos.	Course Outcomes
CO 1	To learn about the history, classification and functionality of polymeric materials.
CO 2	To know about the kinetics of polymerization, details on crystallization and morphology of crystalline polymers, determination of crystalline melting point of a crystalline material and the factors effecting crystalline melting point.
CO 3	To understand the nature and structure of polymers, determination of molecular weight of polymers and thermodynamics of polymer solution.
CO 4	To study the preparation, structure, properties and application of different types of addition and condensation polymers.
CO 5	To know how to prepare polymers by using free radical polymerization, redox polymerization, interfacial polymerization, precipitation polymerization, addition polymerization and condensation polymerization process.
CO 6	To learn experimentally how to characterize and analyze a polymeric compound or material.

DSE- 2 GREEN CHEMISTRY

Sl. Nos.	Course Outcomes
CO 1	To learn about green chemistry and its necessity.
CO 2	To study about the principles of green chemistry and designing the green synthetic routes.
CO 3	To know about the examples of green reactions and future trends in green reaction.
CO 4	To learn the synthesis, psychological properties, isolation, medicinal importance and other synthetic use of terpenes and alkaloids.
CO 5	To learn how to perform green synthesis of a number of organic compounds in the laboratory.

Semester-VI

CORE-13 INORGANIC CHEMISTRY- IV

SI. Nos.	Course Outcomes
CO 1	Know organometallic compounds.
CO 2	Preparation and properties of different organometallics.
CO 3	Study of catalysis by organometallic compounds.
CO 4	Thermodynamics and kinetic aspect of metal complexes.
CO 5	Qualitative analysis of inorganic mixture.

CORE-14 ORGANIC CHEMISTRY- V

SI. Nos.	Course Outcomes
CO 1	Chemistry of amines, peptides and proteins.
CO 2	Knowledge on enzymes and nucleic acids.
CO 3	Study of concept of energy in Biosystem.
CO 4	Study of structure and importance of Pharmaceutical compounds.
CO 5	Determination of saponification value of esters and oils.

DSE3 INDUSTRIAL CHEMICALS AND ENVIRONMENT

SI. Nos.	Course Outcomes
CO 1	Study of industrial gases and inorganic chemicals.
CO 2	Knowledge on industrial metallurgy.
CO 3	To know the environment and its segments.
CO 4	To understand the concept of energy and environment.
CO 5	Introduction of Bio-catalysis.
CO 6	Determination of COD and BOD.

DSE- 4- DISSERTATION

SI. Nos.	Course Outcomes
CO 1	To know how to do research work and write a review article on a particular field/topic as assigned by the teacher
CO 2	To know how to handle the instruments and use technical devices for carried out research works.

Semester-I/II

GE-1- CHEMISRTY

SI. Nos.	Course Outcomes
CO 1	To learn the basic concept, terms and equations of Atomic Structure; Chemical Periodicity, Chemical Bonding and Hybridisation.
CO 2	To learn about synthesis, properties and reactions of Aliphatic Hydrocarbons.
CO 3	To learn about the Fundamentals of Organic Chemistry; Stereochemistry; types, Mechanism and Examples of Nucleophilic Substitution Reaction and Elimination Reaction
CO 4	To learn practically how to do the quantitative estimation of ions in a solution by using iodometric titration, permanganate titration and dichromate titration.
CO 5	To learn how to estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture and how to estimate of water of crystallization in Mohr's salt by titrating with KMnO_4 .
CO 6	To study the estimation of oxalic acid by titrating it with KMnO_4 .

Semester-III/IV

GE-2- CHEMISRTY

SI. Nos.	Course Outcomes
CO 1	To understand detail about Chemical thermodynamics, Chemical equilibrium.
CO 2	To understand Acid, Base. Calculation of PH of solution. To understand about Buffer solution.
CO 3	learn in detail about the preparation, properties, chemical reactions and mechanisms of Alcohol, Phenol, Ethers, Aldehydes, Ketones, Carboxylic acids, Esters, Amides, Amines, Diazonium salts, Amino-acids and Carbohydrates.
CO 4	Measurement of pH of different solutions Preparation of buffer solutions.

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Undergraduate Program (CBCS)

Program Specific Outcomes (PSO)

All of the program of undergraduate students is designed to introduce the modern laboratory methods and principals of different scientific Equipments. The chemistry students are exposed to applied Laboratory techniques independent thinking and team learning. They also provide with research opportunities.

Program Specific Outcomes

Sl. NOs	Description
PSO 1	To understand Social, Economical and Environmental awareness.
PSO 2	To understand basic concept of Organic, Inorganic and physical chemistry during under graduate level.
PSO 3	After completion of chemistry course at undergraduate level, students are able to select, organize, scientific information from proper source, apply the principles of different theories to predict chemical properties and chemical reactivity. Also interpret and analyze quantitative data.
PSO 3	After completion of spectroscopic techniques students are able to determine the structure of various unknown organic molecule from molecular formula and spectral data.
PSO 4	To know safety about how to carry the Experiments by taking different precaution. Also get knowledge about different apparatus, chemicals, principles, reactions and their mechanism while performing Experiments.